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## Notes on *Alcis variegata* (Moore), *A. colorifera* (Prout) (Geometridae, Ennominae), and their allies from the Sunda Islands, with descriptions of two new species

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**Abstract** Two species-groups of *Alcis* from the Sunda Islands are revised. The *A. variegata* complex: *A. variegata* (Moore), *A. convariata* (Prout), stat. & comb. nov., *A. hemiphanes* (Prout), *A. cockaynei* (Prout), *A. lutzi* sp. nov. (Sumatra), *A. paukstadtii* sp. nov. (Flores), *A. praevariegata* (Prout). *Alcis taiwanavariegata* nom. nov. is proposed for *Boarmia subochrearia* Wileman & South, 1917, currently assigned to *Alcis* and preoccupied by Leech, 1897. The *A. colorifera* complex: *A. colorifera* (Prout), *A. periphracta* (Prout).

**Key words** Geometridae, Ennominae, *Alcis variegata*, *Alcis colorifera*, taxonomic notes, new species, Sunda Islands.

In my previous paper (Sato, 2005), two species groups of the genus *Alcis* Curtis from Southeast Asia, the *pammicra* and *maculata* complexes, were revised. In this paper, I will give a taxonomic account of two further species groups of *Alcis* from the Sunda Islands (Borneo, Sumatra, Java, Flores) in Southeast Asia, with descriptions of two new species. *A. variegata* and *A. colorifera*, and species allied to them will be named here the “*variegata* complex” and “*colorifera* complex” without strict definition, for the sake of convenience. No species belonging to the two complexes have been found from Sulawesi. For precise identification of the taxonomically more confusing species, I examined all available type specimens and their genitalia at the Natural History Museum, London, UK, when I visited there in 2002.

Detailed notes on the localities of collecting sites in Sumatra were given by Diehl (1982, 1997), Kobes (1985, 1992) and Schintlmeister (1994).

The following acronyms are used to indicate the location of the specimens. BMNH: The Natural History Museum, London, UK. MS: Manfred Sommerer collection, Munich, Germany. NIAES: Natural Resources Inventory Center, National Institute for Agro-Environmental Sciences, Tsukuba, Japan. NSMT: National Science Museum, Tokyo. ZFMK: Zoologisches Forschungsinstitut und Museum Alexander Koenig, Bonn, Germany. ZSM: Zoologische Staatssammlung, Munich, Germany.

### *Alcis* Curtis, 1826

Type species: *Phalaena repandata* Linnaeus, 1758.

#### *Alcis variegata* complex

*Alcis variegata* (Moore) and six species allied to it, including two new species, are distributed in the Sunda Islands. They have very similar male and female genitalia to one another, and their superficial appearance is sometimes rather more useful to identify each species, though there is considerable individual variation.

Male genitalia: socii undeveloped; valva with a digitate ampulla and a much smaller digitate

process arising basally to it; juxta with paired long rod-like projections; aedeagus vesica with a single slender cornutus, which is tapered basally and more or less swollen to one side near distal end. Female genitalia: bursa copulatrix lightly sclerotized posteriorly; colliculum developed, with parallel sides.

The following seven species from the Philippines are clearly members of the *variegata* complex (Sato, 1996): *A. perplexa* Sato (Mindanao), *A. kitanglandensis* Sato (Mindanao), *A. mindanalensis* Sato (Mindanao), *A. antincta* Sato (Mindanao), *A. subtincta* (Warren) (Luzon, Mindanao), *A. diadela* (West) (Luzon), *A. pissoconeta* (West) (Luzon).

### *Alcis variegata* (Moore) (Figs 1–9)

*Pseudocoremia variegata* Moore, 1888: 240.

*Cleora nebulosa* Swinhoe, 1891: 488. **Syn. nov.**

*Alcis variegata*: Sato, 1991: 285; Parsons *et al.*, 1999: 33.

*Cleora hypopoecila* Prout, 1928: 151. **Syn. nov.**

*Alcis hypopoecila*: Parsons *et al.*, 1999: 29.

*Cleora hypopoecila* was described by Prout (1928) on the basis of five males and one female from Sumatra as a close relative of *Pseudocoremia variegata* Moore from India (Darjeeling). The male and female genitalia of both species are identical. Sumatran *hypopoecila* (Figs 3–4) seems to be slightly different from Indian *variegata* in wing colour: the upperside ochreous or reddish shades are reduced, and the underside is more yellowish, as pointed out by Prout (1928) in the original description of *hypopoecila*. However, after close examination of many specimens collected from Sumatra, Peninsular Malaysia, Thailand, Vietnam (Fig. 9), Nepal (Sato, 1993, pl. 34: 16) and S. China (Figs 7–8), I could find no constant geographical differences from the Indian specimens (Figs 1–2, 5–6). Therefore I have come to the conclusion that all of them should be treated as the same species, and consequently *hypopoecila* is newly synonymized with *variegata*. It is impossible to separate this variable species into two or more subspecies. In order to avoid additional confusion, no subspecific name should be used for any population.

Male (Figs 54–55) and female genitalia (Figs 70–71) are illustrated here for the first time.

Type material examined. Syntype of *Pseudocoremia variegata* Moore. 1 ♂, “Type/Darjeeling/*Pseudocoremia variegata* Moore, ♂, type/Khasia Hs. 94-189/Moore Coll. 94-106/Geometridae genitalia slide No. 16213”, BMNH. Genitalia checked. Syntype of *Cleora nebulosa* Swinhoe. 1 ♂, “*Cleora nebulosa* Swinhoe, ♂, type/Khasi Hills, 94-66”, BMNH. Syntypes of *Cleora hypopoecila* Prout. 1 ♂, “*Cleora hypopoecila* Prout, ♂, type/Type/7. 22, North Korintji Valley, S. W. Sumatra 5,000 ft., Sept.-Oct. 1921, C. F. & J. Pratt/Presented by J. J. Joicey Esq. Brit. Mus. 1931-444”, 1 ♂, “*Cleora hypopoecila* Prout, ♂, paratype/7. 22, North Korintji Valley, S. W. Sumatra 5,000 ft., Sept.-Oct. 1921, C. F. & J. Pratt/Joicey Bequest Brit. Mus. 1934-120, Geometridae genitalia slide No. 16211”, BMNH. Genitalia checked.

Material examined. Sumatra. 9 ♂ 4 ♀, Berastagi 1,500 m, 3 ♂, Tele 1,600 m, 4 ♂, Sitahoan 1,200 m, 1 ♂, Dairi Mts, 1,600 m, 3 ♂, Bukit Subang 1,200 m, 2 ♂ 1 ♀, Gunung Talang 1,600 m, 1 ♂, Liwa 1,000 m, 9 ♂ 1 ♀, Holzweg III 1,200 m.

I also examined many specimens collected from India, Sikkim, Nepal, Myanmar, Laos, S. China, Vietnam, Thailand and P. Malaysia.

Geographical range. India, Sikkim, Nepal, Myanmar, Laos, S. China, N. Vietnam, Thailand, Peninsular Malaysia, Sumatra.

The following subspecies have been described (Parsons *et al.*, 1999): *nebulosa* Swinhoe (India, Khasi Hills), *convariata* Prout (Java) and *subochrearia* Wileman & South (Taiwan). The taxon *nebulosa* cannot be distinguished from other Indian specimens of *variegata* in external characters, which indicates that it should be treated as a junior synonym of *variegata*. On the other hand, *subochrearia* and *convariata* can be reliably separated from *variegata* by external and genitalic characteristics, as described below. Therefore, they should both be treated as a distinct species.

### *Alcis taiwanovariegata* nom. nov. (Figs 13–16)

*Boarmia subochrearia* Wileman & South, 1917: 53, nec Leech, 1897: 422 (identity: *Boarmia subochrearia*).

Junior primary homonym.

*Alcis variegata*: Prout, 1914: 269; Chang, 1990: 328.

*Alcis variegata subochrearia*: Inoue, 1992: 114; Parsons *et al.*, 1999: 33; Wang, 1998: 167; Fu & Tzuoo, 2002: 27.

*Boarmia subochrearia* was described by Wileman & South (1917) from Taiwan based on one male taken at “Arizan” (=Mt Alishan). Previously, *Alcis variegata* (Moore) had been first recorded by Prout (1914) from Taiwan, with a short comment: “slightly darker than the Indian form”. Later Chang (1990) redescribed and illustrated *A. variegata* from Taiwan, and Inoue (1992) downgraded *subochrearia* to be the Taiwanese subspecies of *variegata*. This taxonomic treatment was followed by Wang (1998), Parsons *et al.* (1999) and Fu & Tzuoo (2002). However, my comprehensive analysis of the *variegata* complex indicates that *subochrearia* should be raised to specific level. The scientific name “*Boarmia subochrearia* Wileman & South, 1917” is preoccupied by “*Boarmia subochrearia* Leech, 1897”, both species being currently assigned to *Alcis*. Therefore, a new replacement name *A. taiwanovariegata* nom. nov. is proposed here for the junior homonym.

*Boarmia subochrearia* was described by Leech (1897) on the basis of one female taken at “Omei-Shan” in W. China. The female holotype was redescribed by Sato (1993: 10) as *Alcis*, with a genitalia illustration (fig. 135). No other specimens have hitherto been recorded since the original description, but Dr Stünning has kindly examined male and female specimens in the ZFMK collection, taken at Tsekou and Siao-Lou in SW. China, and informed me that they belong to *subochrearia*, and that the latter is a distinct species closely related to *A. albilinea* Sato, 1993, from India. Male and female imagines of *albilinea* and their genitalia were described and illustrated by Sato (1993).

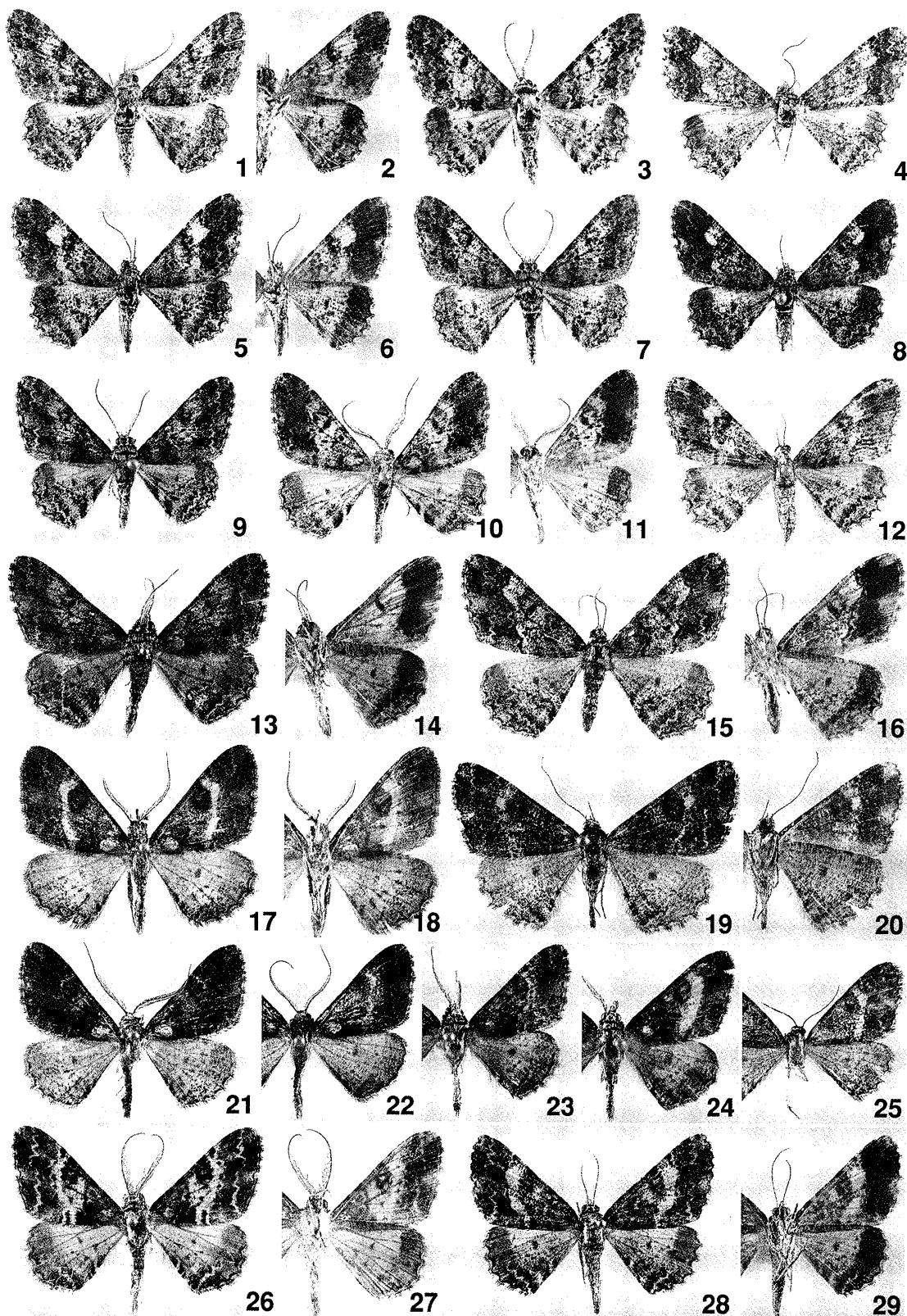
*A. taiwanovariegata* is distinguished from *variegata* by the following characteristics: variable in size, wing colour and intensity of markings, but generally larger and darker, with less distinct maculation, especially in the medial area, which is almost concolorous with the rest (usually paler than the rest in *variegata*). Distinct differences are found in the genitalia as follows.

Male genitalia (Fig. 56). Similar to those of *variegata*, but differing from them as follows: single cornutus slenderer, tapered distally, not forming any projection; valva and cucullus tending to be broader, but variable individually.

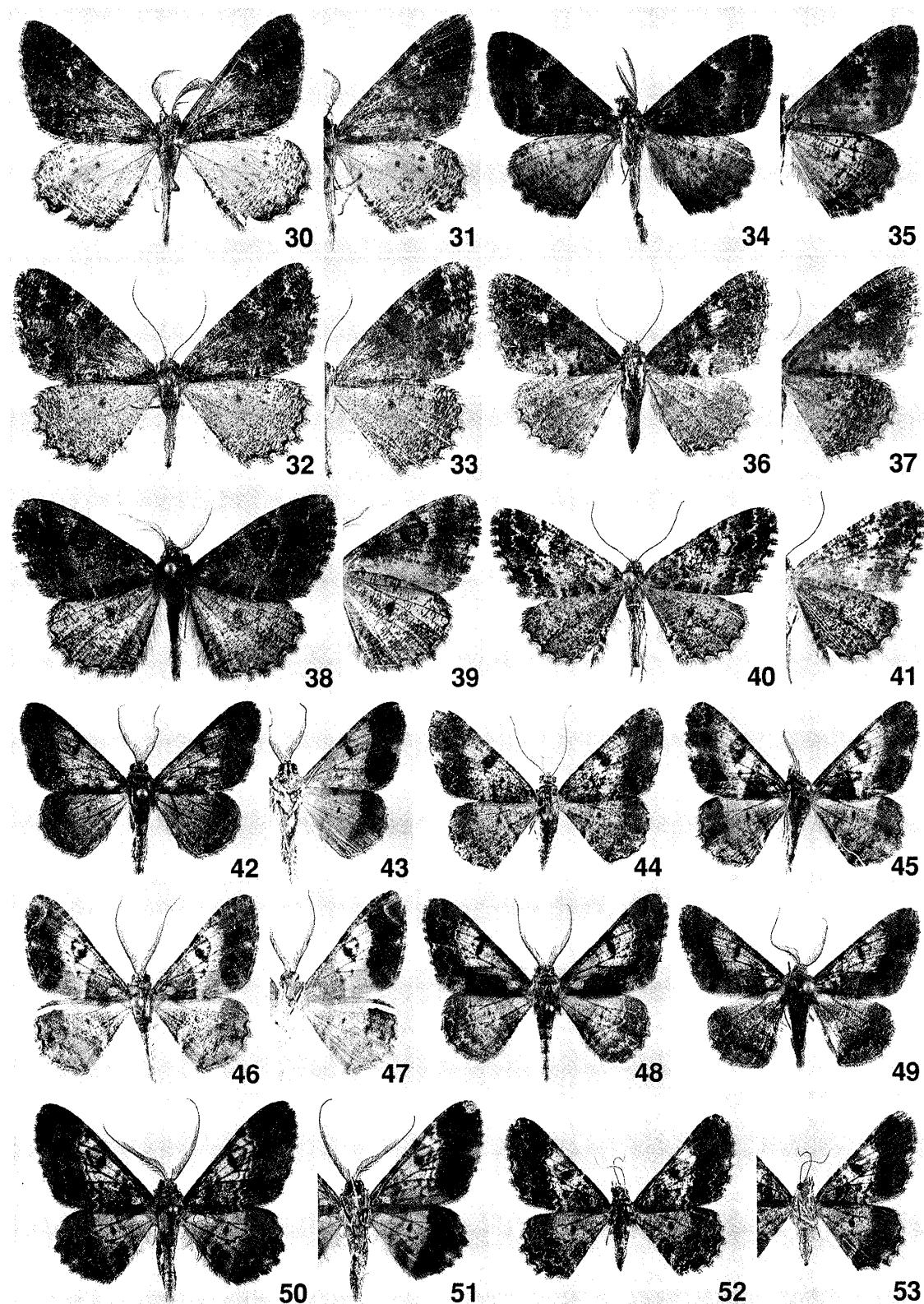
Female genitalia (Fig. 72). Similar to those of *variegata*, but differing from them as follows: posterior sclerotized part of bursa copulatrix longer; colliculum narrower.

Material examined. Many males and females captured at various localities in Taiwan.

Type material examined. Holotype of *Boarmia subochrearia* Wileman & South. ♂, “Arizan, Formosa, 7,300 ft, 23. IV. 1908, A. E. Wileman, ♂/Type/*Boarmia subochrearia* sp.



Figs 1-29. *Alcis* spp. 1-9. *A. variegata* (Moore). 1-2. ♂, India. 3. ♂, Sumatra. 4. ♀, Sumatra. 5-6. ♀, India. 7. ♂, S. China. 8. ♀, S. China. 9. ♂, N. Vietnam. 10-12. *A. convariata* (Prout). 10-11. ♂, Java. 12. ♀, Java. 13-16. *A. taiwanovariegata* nom. nov. 13-14. ♂, Taiwan. 15-16. ♀, Taiwan. 17-25. *A. hemiphanes* (Prout). 17-18. ♂, Java. 19-20. ♀, Java. 21-22. ♂, Sumatra. 23-24. ♂, Sumatra. 25. ♀, Sumatra. 26-29. *A. praevariegata* (Prout). 26-27. ♂, Borneo. 28-29. ♀, Borneo.



Figs 30–53. *Alcis* spp. 30–33. *A. cockaynei* (Prout). 30–31. ♂, Java. 32–33. ♀, Java. 34–37. *A. paukstadtii* sp. nov. 34–35. ♂, holotype, Flores Is. 36–37. ♀, paratype, Flores Is. 38–41. *A. lutzi* sp. nov. 38–39. ♂, holotype, Sumatra. 40–41. ♀, paratype, Sumatra. 42–49. *A. colorifera* (Prout). 42–43. ♂, Sumatra. 44. ♀, Sumatra. 45–47. ♂, Sumatra. 48. ♂, P. Malaysia. 49. ♂, C. Vietnam. 50–53. *A. periphracta* (Prout). 50–51. ♂, Sumatra. 52–53. ♀, Sumatra.

n. Type, ♂/1898F/Wileman Coll. B. M. 1929-261”, BMNH. Holotype of *Boarmia subochrearia* Leech. ♀, “Type/Omei-Shan, 3,620 ft. Native coll. July, 1890/Leech Coll. 1990-64”, BMNH.

Geographical range. Taiwan.

***Alcis convariata* (Prout), stat. & comb. nov. (Figs 10–12)**

*Cleora variegata convariata* Prout, 1935: 231.

*Alcis variegata convariata*: Parsons *et al.*, 1999: 33.

This species was described as a subspecies of *variegata* by Prout (1935) from Java based on “an enormous series” taken at Nongkodjadjar, Singolangoe, Djoenggo, Ardjoeno and Kletak. External appearance and male genitalia indicate that it should be treated as a distinct species.

This species is different from *variegata* as follows. Forewing: medial part paler, often tinged with yellow, contrasted with blackish basal and distal parts. Hindwing: costal part more widely immaculate.

Male genitalia (Fig. 57). Differ from those of *variegata* in the shape of cornutus, which has a more sharply pointed projection.

Female genitalia (Fig. 75). No reliable discriminating characteristics from those of *variegata*, but posterior part of bursa copulatrix tending to be less sclerotized than in *variegata*.

Type material examined. Syntypes of *Cleora variegata convariata* Prout. 1 ♂, “Nongkodjadjar, E. Java, 4,000’, March 1934, (A. M. R. Wegner)/Type/*Cleora variegata convariata* Prout, ♂, type/ Brit. Mus. 1939-1”, 1 ♂, “Nongkodjadjar, E. Java, 4,000’, April 1934, (A. M. R. Wegner)/*Cleora variegata convariata* Prout, ♂/Brit. Mus. 1935-201/Geometridae genitalia slide No. 16214”, BMNH. Genitalia checked.

Material examined. Java. 47 ♂ 16 ♀, Mt Argapura; 1 ♂ 1 ♀, Mt Pangrange 2,000 m.

Geographical range. Java.

***Alcis hemiphanes* (Prout) (Figs 17–25)**

*Cleora hemiphanes* Prout, 1925: 56.

*Alcis hemiphanes*: Parsons *et al.*, 1999: 29.

*Cleora irrita* Prout, 1928: 152. **Syn. nov.**

*Alcis irrita*: Parsons *et al.*, 1999: 29.

*Cleora irrita f. obruta* Prout, 1928: 152 (unavailable).

*Cleora hemiphanes* was described as a close relative of *variegata* by Prout (1925) from Java based on one male taken at Mount Gedeh. *Cleora irrita* was described by Prout (1928) from Sumatra on the basis of fourteen males and three females taken on the “slopes of Mount Korintji, 7,300 feet”, and one male taken at “North Korintji Valley, 5,000 feet”. The form *obruta* was described as a darkened form of *irrita*, taken at the same locality as the typical one, and is certainly just an example of individual variation. There are some intermediate specimens between the typical form and *obruta*. Close examination of both taxa revealed that they were conspecific and that *irrita* should be sunk into *hemiphanes*.

The genital structure of both sexes indicates that this species is closely related to *variegata*. But many differences can be found between them: *hemiphanes* is larger in size; the male antennal pectinations are a little longer; the fovea is more developed, almost unscaled; the

forewing is variable in colour and markings, and sometimes a distinct yellowish postmedial band is developed; the hindwing is paler, tinged with yellow. Individual variations are shown in Figs 17–25.

Male genitalia (Figs 58–59). Almost identical with those of *variegata*. Paired processes of *juxta* shorter; *cornutus* variable in shape individually, as in Figs 58a–60.

Female genitalia (Figs 73–74). Almost identical with those of *variegata*. *Colliculum* wider, posterior part of *bursa copulatrix* more sclerotized at left side.

Type material examined. Holotype. ♂, “Type/E. A. Cockayne, 25. VI. 1910, Gedeh 8,000 ft., Java/*Cleora hemiphanes* Prout, ♂, type/L. B. Prout Coll. B. M. 1939-643/Geometridae genitalia slide No. 16210”, BMNH. Genitalia checked. Syntypes of *Cleora irrita* Prout. 1 ♂, “*Cleora irrita* Prout, ♂, type/Type/7. 22, Slopes of Mt. Korintji, S. W. Sumatra, 7,300 ft., Aug.-Sept. 1921, C. F. & J. Pratt, Presented by J. J. Joicey Esq. Brit. Mus. 1931-444”; 1 ♂, “7. 22, North Korintji Valley, S. W. Sumatra, 5,000 ft., Sept.-Oct. 1921, C. F. & J. Pratt/ Joicey Bequest. Brit. Mus. 1934-120/Geometridae genitalia slide No. 5120”, BMNH. Genitalia checked. I also examined one male of *obruta* in the BMNH, which is labelled, “*Cleora irrita* f(?) *obruta* Prout, ♂, type/Type H. T./7. 22, Slopes of Mt. Korintji, S. W. Sumatra, 7300 ft., Aug.-Sept. 1921, C. F. & J. Pratt, Presented by J. J. Joicey Esq. Brit. Mus. 1931-444”.

Material examined. Sumatra. 6 ♂ 1 ♀, Berastagi 1,500 m; 2 ♂, Dairi-East 1,800 m, 1 ♂ 1 ♀, Dairi-Berge 1,600 m; 3 ♂, Samosir 1,600 m; 6 ♂, Mt Talamau 1,800 m; 1 ♂, Gunung Talang; 1 ♂, Kerinci 3,000 m. Java. 39 ♂ 1 ♀, Mt Argapura; 1 ♂ 2 ♀, Mt Pangrange 2,000 m; 1 ♂, Mt Pangrange 1,625 m.

Geographical range. Sumatra, Java.

### *Alcis cockaynei* (Prout) (Figs 30–33)

*Cleora cockaynei* Prout, 1916: 53.

*Alcis cockaynei*: Parsons et al., 1999: 28.

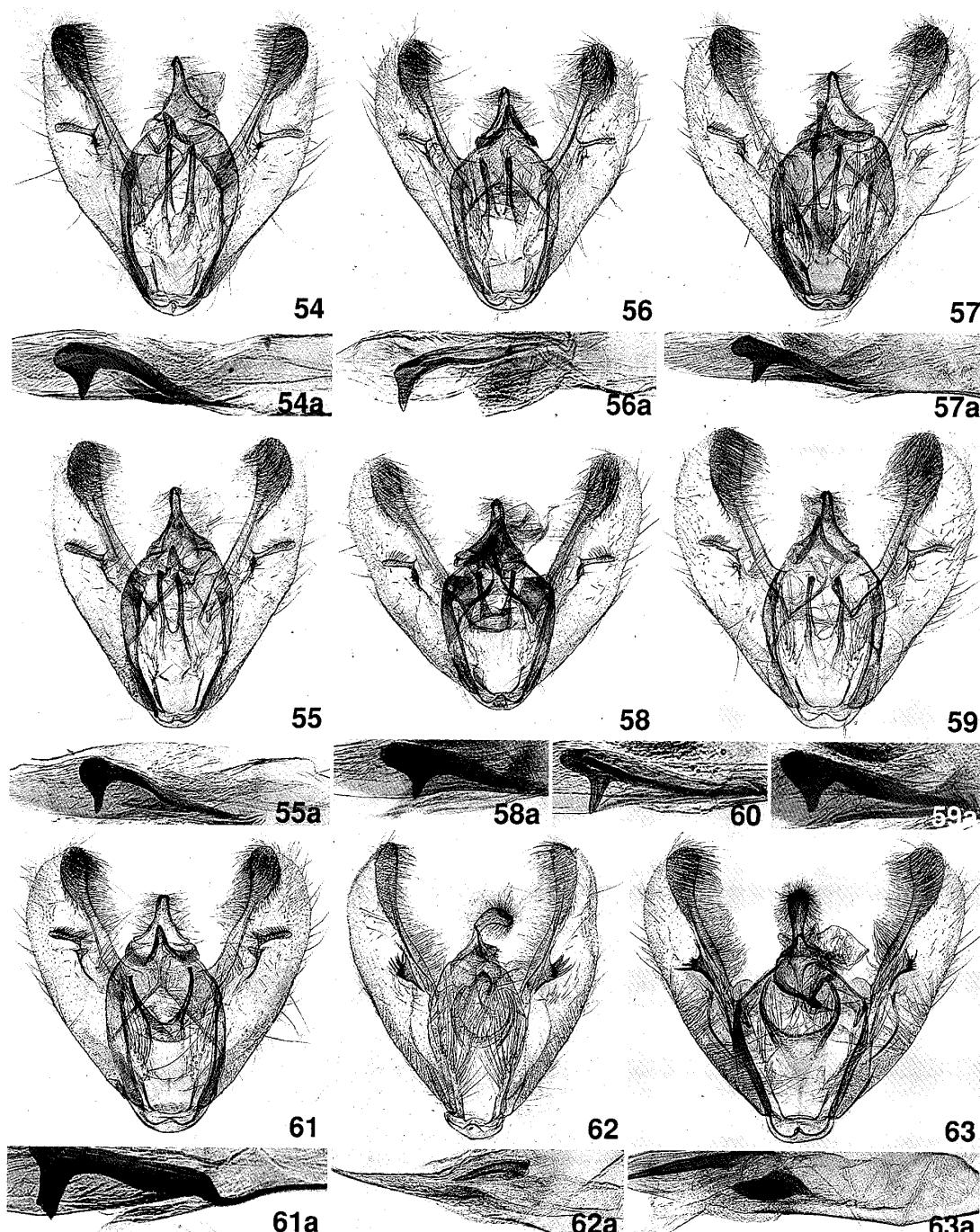
Prout (1916) mentioned that *Cleora cockaynei* was described based on “a female” taken by E. A. Cockayne on July 5th in 1910 at Tosari, Tengger Crater in Java. But judging from his description of the antenna (“pectinations long”) and hindtibia (“not appreciably dilated, apparently without hair-pencil”), it is obvious that his original description was based on a male. I did not find the male holotype in the BMNH, but examined another male specimen and its genitalia there. It was collected at the type locality by the same person the day after the holotype was taken and should have been designated as a paratype. The labels are as follows: “*Cleora cockaynei* Prout, ♂/E. A. Cockayne, 6. vii. 1910, Tosari, Java, Tengger Crater/L. B. Prout Coll., B. M. 1939-643/Geometridae genitalia slide No. 16209”.

For the external characteristics, see the following species.

Male genitalia (Fig. 66). Similar to those of *variegata*, but *juxta* broader and its paired processes shorter and broader than the other species of the complex.

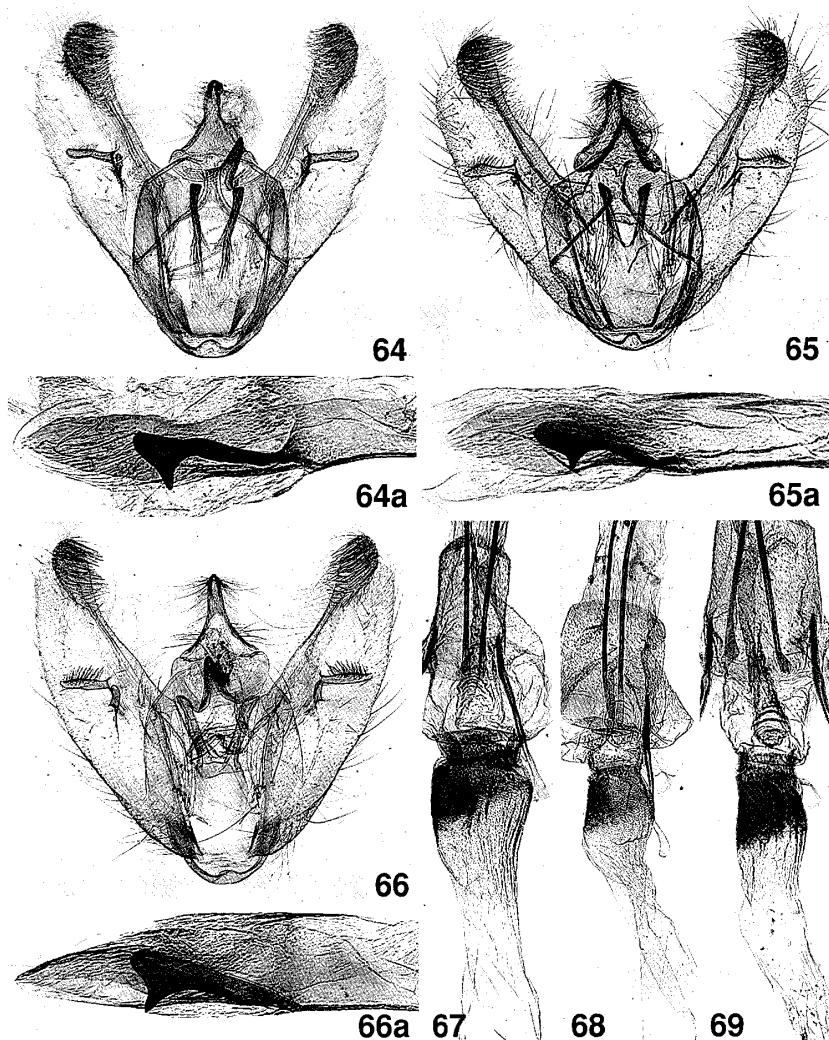
Female genitalia (Fig. 69). Similar to those of *variegata*, but elliptical sclerotized median part of *lamella postvaginalis* with several curved ridges; *colliculum* shorter and broader.

Material examined. E. Java, Mt Argapura, 3 ♂ 3 ♀, iv. 1995 (native collector).



Figs 54–63. Male genitalia of *Alcis* spp. 54–55. *A. variegata* (Moore). 54. India. RS-7104. 55. Sumatra. RS-7106. 56. *A. taiwanovariegata* nom. nov. Taiwan. RS-7107. 57. *A. convariata* (Prout). Java. RS-5875. 58–60. *A. hemiphanes* (Prout). 58. Java. RS-7078. 59. Sumatra. RS-7108. 60. *Cornutus*, greatly enlarged. Sumatra. RS-2896. 61. *A. praeveriegata* (Prout). Borneo. RS-7090. 62. *A. colorifera* (Prout). Sumatra. RS-1790. 63. *A. periphracta* (Prout). Thailand. RS-7094. a: aedeagus, cornutus greatly enlarged.

Geographical range. Java.

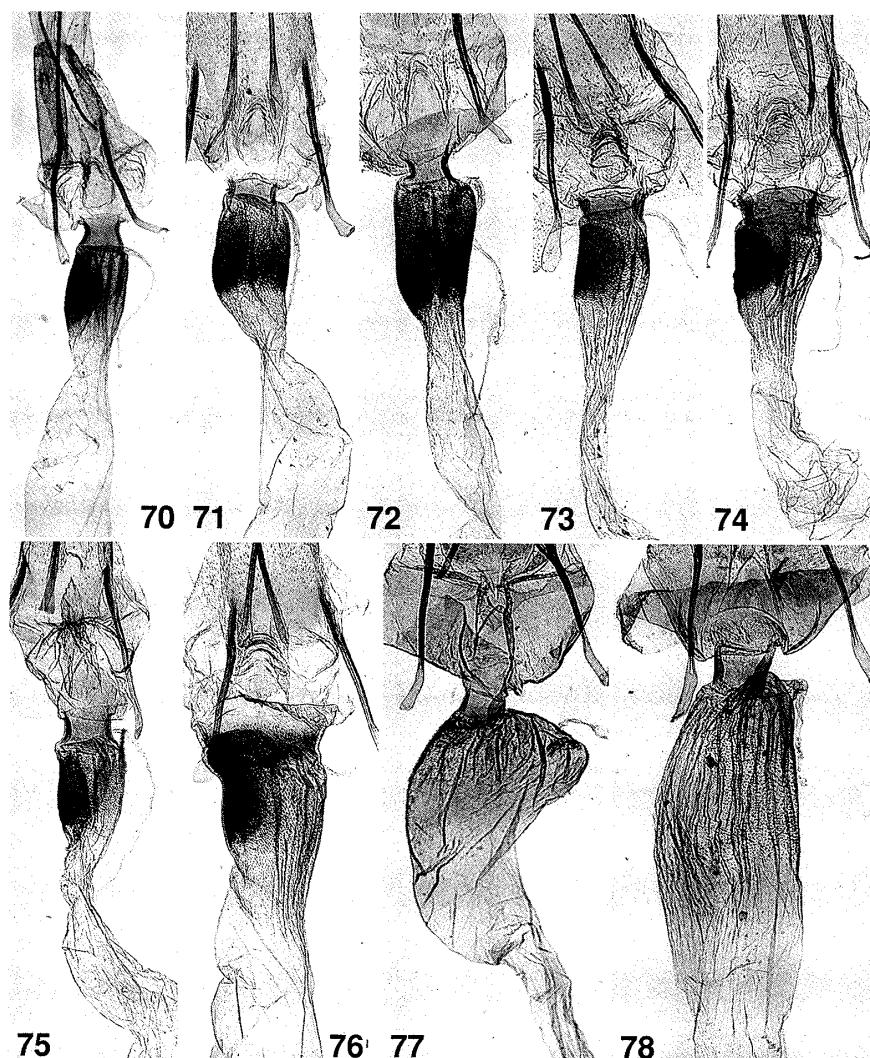


Figs 64–66. Male genitalia of *Alcis* spp. 64. *A. lutzi* sp. nov. Sumatra. RS-6212. 65. *A. paukstadtii* sp. nov. Flores Is. RS-7109. 66. *A. cockaynei* (Prout). Java. RS-4493. a: aedeagus, corona greatly enlarged.

Figs 67–69. Female genitalia of *Alcis* spp. 67. *A. lutzi* sp. nov. Sumatra. RS-7089. 68. *A. paukstadtii* sp. nov. Flores Is. RS-6223. 69. *A. cockaynei* (Prout). Java. RS-7088.

#### *Alcis lutzi* sp. nov. (Figs 38–41)

Length of forewing 18–19 mm, wingspan 34–37 mm. Male: a cluster of spines on the third abdominal sternite and hind tibial hair-pencil developed. Variable in wing colour and maculation. Forewing reddish to blackish brown with inconspicuous grey lines and a distinct black discocellular spot, but sometimes lines almost disappearing; antemedial line angled between veins A and CuA<sub>2</sub>; postmedial line gently out-curved beyond cell; subterminal line narrow and zigzag. Hindwing much paler than forewing, irrorated with fuscous; a discocellular spot paler and straighter postmedial line less defined than on forewing; two black dashes developed on inner margin. Underside of both wings paler with less defined markings than upperside, but a discocellular black spot on hindwing more distinct than on upperside. Female (based on one specimen): forewing paler than male, whitish between antemedial and medial lines; subterminal zigzag line whitish.



Figs 70–78. Female genitalia of *Alcis* spp. 70–71. *A. variegata* (Moore). 70. India. RS-7105. 71. Sumatra. RS-2658. 72. *A. taiwanovariegata* nom. nov. Taiwan. RS-5127. 73–74. *A. hemiphanes* (Prout). 73. Java. RS-5071. 74. Sumatra. RS-5123. 75. *A. convariata* (Prout). Java. RS-5070. 76. *A. praevariegata* (Prout). Borneo. RS-7091. 77. *A. colifera* (Prout). Sumatra. RS-2668. 78. *A. periphracta* (Prout). Sumatra. RS-2656.

This new species is similar to *cockaynei* in appearance, but can be easily distinguished by smaller wing size (*cockaynei*: length of forewing 21–23 mm, wingspan 35–38 mm), presence of hind tibial hair-pencil and the third sternite abdominal spines in male (in *cockaynei* both absent) and the darker hindwing with straight postmedial line, which is absent or reduced to vein-dots in *cockaynei*.

Male genitalia (Fig. 64). Similar to those of *cockaynei*, but cucullus slightly more dilated, juxta not so broad and its paired processes longer and slenderer.

Female genitalia (Fig. 67). Similar to those of *cockaynei*, but colliculum with broader lateral sides, posterior sclerotized part of bursa copulatrix shorter.

Holotype. ♂. "SUMATRA sept., (Ache Tenggara), Gunung Leuser, 3°46'20"N/ 97°11'19"E", Bewak Kaki Leuser, 3,100 m, 23/24. ii. 1997, leg. Plössl & Tarmann, coll. M. Sommerer",

ZSM after further study, at present in MS. Paratypes. 2 ♂, same data as holotype, 2 ♂ 1 ♀, "SUMATRA sept., (Aceh tenggara), Gunung Leuser, 3°49'12"N/ 97°10'42"E, "Bewak Kaling" 2,860 m, 25. ii. 1997, leg. Plössl & Tarmann, coll. M. Sommerer", MS.

Geographical range. Sumatra.

Etymology. The specific name is dedicated to Dr Lutz Kobes on Mr Sommerer's recommendation. He was the founder of, and for so many years headed, the Heterocera Sumatrana Society and has been managing the edition of the Heterocera Sumatrana publications.

#### *Alcis paukstadtii* sp. nov. (Figs 34–37)

Length of forewing 18–20 mm, wingspan 31–34 mm. Variable, but somewhat similar to *lutzi* in wing size, colour and maculation, differing from it as follows. Male: third abdominal sternite without a cluster of spines; hind tibial hair-pencil absent. Forewing: antemedial line more gently incurved; postmedial line with a series of black dots on veins; sometimes tinged with orange yellow below cell in medial area and distad of postmedial line. Hindwing: basal half whitish, without postmedial line. Female: forewing with white maculation more clearly developed basad of postmedial line.

Male genitalia (Fig. 65). Similar to those of *lutzi*, but cornutus with a pointed projection arising further from distal end. Also similar to those of *cockaynei*, but paired processes of juxta longer.

Female genitalia (Fig. 68). Similar to those of *lutzi*, but colliculum with narrower lateral sides, posterior part of bursa copulatrix more weakly sclerotized.

Holotype. Indonesia, Flores Is. ♂, Prov. NTT, 9 km south of Ruteng, Golo Lusang 1,820 m, 27. ii–9. iii. 1992 (U. Paukstadt), NIAES. Paratypes. 1 ♂ 2 ♀, same data as holotype, NIAES; 2 ♂ 1 ♀, same data as holotype, ZFMK.

Geographical range. Flores Is.

Etymology. The taxon is named after Captain Ulrich Paukstadt, who captured the holotype and the paratypes.

#### *Alcis praeveriegata* (Prout) (Figs 26–29)

*Cleora praeveriegata* Prout, 1926: 202.

*Cleora aeglophanes* Prout, 1926: 203.

*Alcis aeglophanes*: Holloway, 1976: 81.

*Cleora amictozona* Prout, 1932: 114.

*Alcis praeveriegata*: Holloway, 1994: 238; Parsons *et al.*, 1999: 31.

This species was described by Prout (1926) from Borneo as *Cleora*, and was transferred to *Alcis* by Holloway (1994) with two new synonymies (*aeglophanes* and *amictozona*). It can be easily distinguished by the male and female genitalia from the rest of the *variegata* complex.

Male genitalia (Fig. 61). Illustrated by Holloway (1994, fig. 502). Paired processes of juxta strongly outcurved; cornutus with a rectangular projection near distal end. In particular, the shape of the cornutus (Fig. 61a) is quite unique and most useful to identify this species.

Female genitalia (Fig. 76). Illustrated here for the first time. Most similar to those of

*hemiphanes*, but bursa copulatrix slightly protruding near left side of posterior extremity; colliculum broader.

Type material examined. Holotype of *Cleora praevariegata* Prout. ♂, Sarawak, Mt Murud 6,000–6,500 ft., November, BMNH. Holotype of *Cleora aeglophanes* Prout. ♂, Sarawak, Mt Murud 6,000–6,500 ft., October, BMNH.

Material examined. Borneo. 14 ♂ 4 ♀, Sabah, Kota Kinabalu, Crocker Range 500–1,500 m; 16 ♂ 16 ♀, Mt Kinabalu, Park H. Q. 1,560–1,620 m; 1 ♂, Mt Kinabalu, Poring Spa; 1 ♂, Mamut 1,500 m.

Geographical range. Borneo.

### *Alcis colorifera* complex

*Alcis colorifera* and *A. periphracta* are closely related to each other, and differ from the *variegata* complex by the much longer antenna in the male and the genitalia of both sexes. Male genitalia: socii well developed; valva with a small setose process; pair of processes from juxta strongly incurved, “ring-like” (Holloway, 1994); aedeagus with a short spine-like cornutus. Female genitalia: posterior part of bursa copulatrix not sclerotized.

#### *Alcis colorifera* (Prout) (Figs 42–49)

*Cleora colorifera* Prout, 1916: 53.

*Alcis colorifera*: Holloway, 1994: 237; Parsons *et al.*, 1999: 28.

*Alcis colorifera* was described by Prout (1916) based on one male taken at Penang in Peninsular Malaysia. Very variable individually in wing colour and markings. Several variations are illustrated in Figs 42–49.

Male (Fig. 62) and female genitalia (Fig. 77) are illustrated here for the first time.

Type material examined. Holotype of *Cleora colorifera* Prout. ♂, “Type/Penang, I-IV. 99, (Curtis)/*Cleora colorifera* Prout, ♂, type/Rothschild Bequest B. M. 1939-1/Geometridae genitalia slide No. 13806”, BMNH. Genitalia checked.

Material examined. Sumatra. 1 ♀, Berastagi 1,500 m; 3 ♂ 2 ♀, Holzweg II 1,050 m; 3 ♂, Holzweg III 1,200 m; 6 ♂, Parapat 1,150 m; 1 ♂, Samosir 1,600 m; 7 ♂ 1 ♀, Bukit Subang 1,200 m; 1 ♂, Liwa 1,000 m; 1 ♂, Lampung; 1 ♂, Beng Kulu; 1 ♂, Sitahoan 1,200 m. Java. 1 ♂, W. Java, Cianjur Selatan, Ciloto vic. Cipanas, Mt Beser 1,400 m, 25. ix. 2003; 3 ♂, Cianjur Selatan, ca 5km N Sukanegara, Mt Sumbul 1,300 m, 24–30. ix. 2003; 1 ♂, Cipanas, tea-plantation 1,200 m, 12. xi. 2004; 2 ♂, Pangrango, Mt Gede, xi. 2004 (H. Schnitzler); 2 ♂ 1 ♀, Mt Salak, 1,000–1,500m, 6°42'S 106°44'E, vii. 1996 (V. Siniaev), ZFMK.

I also examined many specimens from Peninsular Malaysia, and a few from the other region as follows. Thailand. 1 ♂, S. Thailand, Nakhon Si Thammarat, Tha Sala, Kra Raw, Kan Leong 650 m, Khao Luang Natn. Pk, 7–8. viii. 1987 (M. Owada), NSMT. Myanmar. 2 ♂, Burma, Tenasserim 800 m, 15. xi. 1995; 3 ♂, SE. Burma, Daena Hills, 4, 11, 13. vi. 1991 (S. Steinke), ZFMK. Vietnam. 1 ♂, C. Vietnam, Thua Thien Hue, Bach Ma 1,200–1,400 m, 5–10. v. 2003 (M. Owada), 2 ♂, 2–6. xi. 2001 (U. Jinbo), NSMT.

Geographical range. Peninsular Malaysia, Sumatra, Java, Thailand, Myanmar, Vietnam. The localities other than Peninsular Malaysia are new records.

***Alcis periphracta* (Prout) (Figs 50–53)**

*Cleora periphracta* Prout, 1926: 202.

*Alcis periphracta*: Holloway, 1976: 81; Holloway, 1994: 237; Parsons *et al.*, 1999: 31.

This species was described by Prout (1926) from Borneo, and was recorded from Malaya and Java by Holloway (1976). But Java was deleted from the geographical range by Holloway (1994), and no specimens have been found in Java. Sumatra, Thailand and Myanmar are here added to the range. Easily distinguished from *colorifera* by superficial appearance, not to mention the genitalia of both sexes.

Male genitalia (Fig. 63). Similar to those of *colorifera*, but cucullus shorter and broader, juxta narrower with more strongly incurved paired processes, aedeagus narrowed and rounded apically (in *colorifera* pointed at apex), stick-like cornutus longer. Also illustrated by Holloway (1994, fig. 503).

Female genitalia (Fig. 78). Similar to those of *colorifera*, but colliculum broader, bursa copulatrix broader, cylindrical, slightly narrowed medially (in *colorifera* abruptly swollen posteriorly), lightly sclerotized and ribbed posteriorly. Illustrated here for the first time.

Type material examined. Syntype. 1 ♂, Mt Penrissen 3,500 ft, Sarawak, BMNH.

Material examined. Sumatra. 1 ♂, Berastagi 1,500 m; 5 ♂, Karo Highland 900 m; 16 ♂ 8 ♀, Holzweg II 1,050 m; 2 ♂ 3 ♀, Holzweg III 1,200 m; 10 ♂ 7 ♀, Parapat 1,150 m; 3 ♂ 1 ♀, Sitahoan 1,200 m; 1 ♂ 1 ♀, Gunung Malayu 80 m; 1 ♂ 1 ♀, Aek Kanapan 10 m; 4 ♂ 1 ♀, Bukit Subang, 1,200 m. Myanmar. 11 ♂ 3 ♀, Kachin, Putao, Mt New Zin 750 m, 16–20. vi. 1998 (K. Yazaki). N. Thailand. 1 ♂, Wiang Pa Pao, Chang Rai, 29. iv–3. v. 2002 (T. Mano).

I also examined some male and female specimens collected from Borneo and Peninsular Malaysia.

Geographical range. Peninsular Malaysia, Borneo, Sumatra, Thailand, Myanmar.

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## 摘要

スンダ列島の *Alcis variegata*, *A. colorifera* (シャクガ科, エダシャク亜科) とそれぞれの近縁種に関する知見と 2 新種の記載(佐藤力夫)

筆者 (Sato, 2005) は、先に東南アジアの *Alcis* 属に関する分類学的再検討の必要性を述べ、*A. pammicra* (Prout) と *A. maculata* (Moore) と各近縁種群について報告した。本報では、スンダ列島の *Alcis variegata* (Moore) と *A. colorifera* (Prout) とそれぞれに近縁の種について再検討をおこなった。主な知見は次の通り。

### *Alcis variegata* complex

#### *A. variegata* (Moore)

スマトラから記載された *Cleora hypopoecila* Prout を *variegata* の junior synonym とし、2 亜種 *subochrearia* (台湾) と *convariata* (ジャワ) を種に昇格させた。

#### *A. taiwanovariegata* Sato (台湾)

*Boarmia subochrearia* Wileman & South, 1917 と *B. subochrearia* Leech, 1897 は、ともに *Alcis* 属の一員であり、homonym 関係にあるため、前者に対して新置換名を提唱した。

*A. lutzi* Sato (スマトラ) と *A. paukstadtii* Sato (フローレス島) を新種として記載した。

そのほか、*A. convariata* (Prout), *A. hemiphaenes* (Prout), *A. cockaynei* (Prout), *A. praevariegata* (Prout) を取り上げた。

*A. colorifera* complex

*A. colorifera* (Prout), *A. periphracta* (Prout) の 2 種を取り上げた。

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